

Improvement of Description and Taking Into Account for Transport Phenomena in Mathematical Models of Gas and Liquid Solutions Evolution

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In Ref. [1] the development and results obtained for transport coefficients of a fluid media is presented. The author believe that is expedient to combine mean-mass and mean-particles velocities of a medium and components movement in a mathematical model for moving solutions. The analogs of relations in Ref. [1] for diffusivities, pressure diffusion and thermal diffusion ratios are obtained. Correspondingly, the Onsager relations for diffusivities and linear equations system that determine pressure-diffusion ratios through thermodynamic functions of a medium are also obtained. For the ideal gas it is shown that, contrary to a usually accepted position about a lack of a uniqueness in definition of the thermal stream, only one quantity satisfies resonable physical requirements. It is shown that the mentioned circumstance brings to a conclusion that it is necessary to accept as driving forces of a diffusion not gradients of chemical potentials or of their ratios to temperature, but gradients of a component's partial pressure logarithms. The advantages of such choice are noted.

Some corrections are added to a system of usually used evolutionary equations for a moving fluid solution. As a result the system is not quite equivalent with the initial system. It is necessary further clearing up about a question on importance of distinctions. The mathematical model of chemically reacting ideal gas at conditions of a local thermodynamic equilibrium [2,3] is improved by means of considering the system – as ideal solution of molecular components and imperfect solution of atomic components. The relations for transport factors of such gas as imperfect solution and relation of connection between factors corresponding to two aspects of consideration are obtained. The analytical form of general solution for the system of thermodynamical operating masses laws is also used.

1. Ya.M. Buzhdan, *Journal of Physical Chemistry (Russian Federation)* **68**, 726 (1994).
2. G.A. Tirskey co-auth-s/*Journ. Appl. Mech. and Tech. Phys (RF)*, 73 (1971).
3. I.A. Sokolova, *Mathematical Modelling (Russian Federation)* **5**, 71 (1993).